TABLE 11 – GET THE FACTS: OBTAINING EMISSION CREDIT FOR LIGHT-DUTY NGVS THROUGH EPA'S VMEP

Emission Reduction Credits for Light-duty Natural Gas and Electric Vehicles through EPA's VMEP

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Clean Cities are continuing their commitment to invest in a more fuel-diversified future for American transportation, acquiring cars and light trucks for public and private fleets that run on electricity, natural gas, and other clean fuels that help reduce oil dependence. In the past, Clean Cities Coordinators have often been told that these alternative-fuel vehicles (AFVs), especially those converted from conventional units, are not "clean" enough to earn a net emissions reduction credit (relative to their conventional counterparts) for regulated air quality purposes such as ozone State Implementation Plans (SIPs). However, with the increased availability of manufacturer-certified original equipment (OEM) AFVs beginning in the late 1990s, it is now possible to demonstrate measurable and in some cases substantial per-mile emissions reductions for the late-model non-petroleum fleet, based on EPA emissions certification tests. Moreover, EPA's Voluntary Mobile Source Emission Reduction Program (VMEP), introduced in late 1997, enables regions needing emission reduction credits to take them "painlessly" (i.e., without SIP commitment or penalty) with voluntary programs such as those adopted by Clean Cities. Argonne National Laboratory (ANL) has been working with EPA to develop a tool that will enable Clean Cities to estimate appropriate AFV emission reduction credits easily and systematically for each calendar year through 2004. The method currently employs the logic and data embedded in EPA's MOBILE5b model, but will be made compatible with MOBILE6 when that model becomes available. It is simple to use and tailored to conditions found in each of the Clean Cities.

The credit computation method in its April 1999 form seeks to capture the effects of several properties of natural gas and electricity as transportation fuels that are known to result in effective ozone mitigation. These include:

I. the virtual absence of cold start emissions attributable to either fuel
II. emission deterioration, under normal maintenance, no worse than and possible superior to conventional fuel
III. the extremely low levels of carbon monoxide and non-methane hydrocarbons from both fuels
IV. substantial net reductions of NOx from electric vehicles
V. more lenient emission standards for light trucks, relative to automobiles, that result in greater net credits for AF trucks, vans, and SUVs than for passenger cars
VI. displacement of NMHC emissions that would otherwise occur in urban core areas due to conventional fleet vehicle operation
VII. displacement of vehicles that contribute substantial early-morning "bursts" of ozone precursor emissions that become available for photochemical reaction as the day heats up
VIII. (potential) displacement of NOx emissions in suburban and fringe areas (where NOx control appear to be an effective strategy).

The procedure creates a template for identifying *daily* CO, NMHC and NOx emission reduction credits for Clean Cities outside California during the peak summer ozone season; the number of days to multiply this daily value by is at the user's discretion, but should not be extended without adjustment into the non-ozone season if a yearly value is to be estimated. As currently implemented, the method identifies the

appropriate classification "bin" in which each Clean City belongs (what is its average maximum daily temperature in July; what is its daily summer temperature rise; is it high or low altitude; is there an I/M program in place; is the area using Federal reformulated gasoline; was the National Low Emission Vehicle Program already implemented there by 1999) and provides the computed MOBILE5b emission factor (in g/mi for conventional light-duty vehicles) for that combination of conditions as the reference emissions of gasoline vehicles of the same age against which net AFV credits are taken.

Utilizing weighted certification test data for 1998 and 1999 model year OEM AFVs and their (paired) conventional counterparts, the method creates a fractional multiplier for emission rates for the three primary pollutants, indexing each of these to the corresponding Clean City-specific MOBILE5b factor. After adjusting for such "give-backs" as NOx emissions from natural gas compressor operation and attributable in-basin emissions of NOx from electric power plants, a net per-mile value is generated that is multiplied by the number of acquired OEM units and the miles each travels per day, then adjusted according the the proportion of each AFV population that is centrally fueled. The output is in the form of a *daily* quantity of emissions reduced (generally in pounds) that can go directly into a summation of total VMEP credits for the area.

One of the most attractive aspects of including AFVs in VMEP programs is that the change in credits is always linear and always increasing: as more qualifying vehicles are acquired and/or they are driven more miles (operating exclusively on the alternative fuel), a corresponding increase in total credit is generated. The method emphasizes the ability of CNG and EV AFVs to get at the main source of ozone excursions: the presence of an ample atmospheric supply of volatile organic compounds, NOx, and CO in the morning and early afternoon hours of a sunny summer day. Not only do natural gas and electric propulsion demonstrably eliminate most of these emissions per equivalent time and distance of vehicular operation, but do so in a manner that is highly effective with respect to timing and location. And, it should be added, the absence of evaporative emissions from natural gas and electric vehicles or their upstream storage locations makes them far more effective on a ozone reactivity-reduction basis than even the most tightly controlled vehicles operating on reformulated gasoline.

The calculation method is under development as of the late April date of this writeup. The conference Table Talk will provide the latest information on the methodology, resulting from work beyond that discussed here. Presently, the model develops credits for light duty vehicles - cars and trucks of up to 8,500 lb. GVW. Some CNG vehicles are presently available in larger truck sizes, and Ford has announced that it will shortly make available new propane truck models that have been certified as "ultra-low-emission vehicles" (ULEVs) when run on propane. Heavy-duty emissions benefits and net credits have also been researched by the U.S. DOE, and could be added to the model within a few months. It is hoped that the Clean Cities Conference will see the roll-out of the "alpha" version of the graphic-interface model that will generate reliable three-pollutant credits directly from user-supplied input on fleet sizes and daily mileage by fuel type. We hope this will enable both Clean Cities customers and stakeholders in the SIP-development community to claim official, well quantified, and EPA-approved credit for emissions reductions in State Implementation Plans where such plans exist and hard credits are likely to be needed. When completed, the model will be made available on diskette and via the Internet, at both the ANL and NREL AFDC sites.